CLAIMS:

1. An optoelectronic device, comprising:

an active region sandwiched between an upper mirror and a lower mirror, wherein at least one of said upper and lower mirrors comprises a plurality of mirror periods wherein at least a portion of said mirror periods comprise alternating layers of a first material having a first index of refraction and a second material having a second index of refraction with a step graded interfacial transition layer there between.

2. The optoelectronic device of claim 1 wherein said alternating layers of said first material and said second material are doped n-type.

3. The optoelectronic device of claim 2 wherein said step graded interfacial transition layer is doped n-type and where concentration of dopant in said step graded interfacial transition layer is about 2-6 times greater than concentration of dopant in said alternating layers.

4. The optoelectronic device of claim 1 wherein said low index of refraction semiconductor layer comprises $Al_xGa_{1-x}As$.

5. The optoelectronic device of claim 4 wherein said high index of refraction semiconductor layer comprises $Al_yGa_{1-y}As$ wherein y is less than 0.3.

6. The optoelectronic device of claim 1 wherein said step graded interfacial transition layer comprises a first transition layer comprising AlGaAs having a first concentration of Al and a second transition layer comprising AlGaAs having a second concentration of Al.

7. The optoelectronic device of claim 6 wherein said first concentration of Al in a range of about 5-15%.

8. The optoelectronic device of claim 6 wherein said second concentration of Al in a range of about 15-25%.

9. The optoelectronic device of claim 1 wherein said active region comprises at least one quantum well.

10. The optoelectronic device of claim 9 wherein said one or more quantum wells comprise InGaAsN.

11. The optoelectronic device of claim 1 wherein the optoelectronic device comprises a VCSEL that emits light at a wavelength in the range from about 780 nm to about 860 nm.

12. The optoelectronic device of claim 1 wherein the optoelectronic device comprises a VCSEL that emits light at a wavelength in the range from about 1200 nm to about 1600 nm.

13. An optoelectronic device, comprising:

an active region sandwiched between a first mirror and a second mirror, wherein the second mirror comprises a plurality of mirror periods wherein said mirror periods comprise alternating layers of a first material having a first index of refraction and a second material having a second refraction with an interfacial transition layer between said first and second materials; and

a tunnel junction formed in said second mirror for injecting holes into said active region.

14. The optoelectronic device of claim 13 wherein the second mirror is doped n-type.

15. The optoelectronic device of claim 14 wherein the first mirror is doped n-type.

16. The optical device of claim 13 wherein said low index layer of said second mirror comprises $Al_xGa_{1-x}As$ and wherein said high index material comprises GaAs.

17. The optical device of claim 16 wherein said high index of refraction semiconductor layer comprises $Al_yGa_{1-y}As$ wherein y is less than about 0.3.

18. The optoelectronic device of claim 17 wherein said interfacial transition layer comprises $Al_zGa_{1-z}As$.

19. The optoelectronic device of claim 18 wherein aluminum concentration ranges from about $0.27<z<0.33$

20. The optoelectronic device of claim 13 wherein the active region comprises one or more quantum wells.

21. The optoelectronic device of claim 20 wherein the one or more quantum wells comprise InGaAsN.

22. The optoelectronic device of claim 13 wherein said interfacial transition layer comprises a step graded semiconductor material.

23. The optoelectronic device of claim 22 wherein said step graded interfacial transition layer comprises a first

transition layer comprising $Al_XGa_{1-X}As$ having a first concentration of Al and a second transition layer comprising $Al_YGa_{1-Y}As$ having a second concentration of Al.

24. The optoelectronic device of claim 23 wherein said first concentration of Al ranges from about 5-15%.

25. The optoelectronic device of claim 23 wherein said second concentration of Al ranges from about 15-25%.

26. A low resistance optoelectronic device, comprising:

a distributed Bragg reflector comprising alternating layers of a first material having a first index of refraction and a second material having a second index of refraction semiconductor material with a step graded interfacial transition layer between said first and second materials.

27. The low resistance optoelectronic device of claim 26 wherein said low index of refraction semiconductor layer comprises AlGaAs.

28. The low resistance optoelectronic device of claim 26 wherein said step graded interfacial transition layer comprises a first transition layer comprising $Al_XGa_{1-X}As$ having a first concentration of Al and a second transition layer comprising $Al_YGa_{1-Y}As$ having a second concentration of Al.

29. The optoelectronic device of claim 28 wherein said first concentration of Al in a range of about 5-15%.

30. The optoelectronic device of claim 28 wherein said second concentration of Al in a range of about 15-25%.

31. An optical subassembly comprising:

an electrical package containing a VCSEL having at least one mirror comprised of a plurality of mirror periods wherein at least a portion of said mirror periods comprise alternating layers of a first material having a first index of refraction and a second material having a second index of refraction with a step graded interfacial transition layer there between and a photodetector for monitoring power of the VCSEL; and

a housing attached to the electrical package, the housing including a ferule for aligning a fiber with an optical path carrying light from the VCSEL.

32. The optoelectronic device of claim 31 wherein said alternating layers of said first material and said second material are doped n-type.

33. The optoelectronic device of claim 32 wherein said step graded interfacial transition layer is doped n-type and where concentration of dopant in said step graded interfacial transition layer is about 2-6 times greater than concentration of dopant in said alternating layers.

34. The optoelectronic device of claim 31 wherein said step graded interfacial transition layer comprises a first transition layer comprising $Al_XGa_{1-X}As$ having a first concentration of Al and a second transition layer comprising $Al_yGa_{1-y}As$ having a second concentration of Al.

35. The optoelectronic device of claim 34 wherein said first concentration of Al in a range of about 5-15%.

36. The optoelectronic device of claim 34 wherein said second concentration of Al in a range of about 15-25%.